

Laisha Review

Issue 1 · 13 October 2026

Monthly · One happy country each issue



Luxembourg: *the happy country that loves its plants*

Moselle vineyards, beech and oak forests, and dairy meadows in the heart of Western Europe.

IN THIS ISSUE

New: Laisha Kids. What Is a Plant?

Reading animals: behaviour and welfare

The quiet work of pollinators

Grapes: a vine for a lifetime

Play: Laisha Run

Crop Health: honest photo diagnosis

Sprinkler and drip, explained

Country Fun: Luxembourg



WELCOME

Why *Laisha Review*

A monthly magazine about growing things, caring for animals and looking after the land, written for readers in every country.

Laisha exists for one reason: agriculture knowledge should belong to everyone. A student preparing for an exam, a farmer deciding when to prune, a vet in her first year of practice, and a six-year-old asking why leaves are green all deserve the same thing: clear, honest, carefully checked answers.

Laisha Review brings a little of that library to you each month. Every issue opens a manual from our degree courses, follows a crop from field to harvest, shows you one of the apps inside Laisha, and gives children a new Laisha Kids book to share.

Each issue also visits one country chosen from among the world's happiest, because a happy country always loves plants. We begin with **Luxembourg**, a small Grand Duchy of forests, vineyards and dairy meadows that regularly ranks among the happiest countries in the world. You will find its Moselle vineyards in our crop story, and its words, woods and farms in Country Fun.

Every article ends with a QR code. Scan it with your phone camera, or type the short link, to open the full manual or app on laisha.ai.

We hope you enjoy Issue 1. Share it with anyone who grows, studies or simply loves plants.

LAISHA SUBSCRIPTION

US\$10 a month, one price worldwide.

Manuals, crop guides, apps and Laisha Kids, at laisha.ai



CONTENTS

3

LAISHA KIDS

What Is a Plant?

Our new series for children begins with Class 1: roots, leaves, seeds and the green magic of sunlight.

6

VETERINARY

Reading the animal

Behaviour is the clearest window into how an animal feels. A tour of a manual on behaviour and welfare.

8

SUSTAINABILITY

The quiet work of pollinators

Bees, natural pest control, living soils: the services farms receive from nature, and give back.

10

CROP

Grapes: a vine for a lifetime

From the steep slopes of the Moselle to vineyards on every inhabited continent: how a grapevine is really grown.

12

GAME

Laisha Run

A free farm runner in your browser. How to play, tips, and a challenge for readers.

14

AN APP IN LAISHA

Crop Health

Photo diagnosis that tells you what it can see, what it might be and how sure it is.

16

FROM THE LAISHA LIBRARY

Sprinkler and drip, explained

The engineering of pressurised irrigation, from nozzles to filters to fertigation.

18

COUNTRY FUN

Luxembourg

Fun facts, words to try, forests and farms, and a mini-quiz.

20

BACK PAGE

Issue quiz and next issue

Five questions from this issue, and a look at what comes next.

🌿 Laisha Review is published monthly by Laisha. Every fact in this issue comes from Laisha's manuals and guides or from well-established sources.

New: Laisha Kids

Short, illustrated books about plants, soil, food and farming for children from Class 1 to Class 10, anywhere in the world. Laisha Review will bring you one new manual in every issue.

LAISHA KIDS · CLASS 1 · AGES 6-7

What Is *a Plant*?

A first book about the green living things that feed the world. Made to be read aloud by a grown-up, or read by a strong early reader.



Hello, plant explorer!

Look out of a window. What can you see? Somewhere, there is a plant. There might be grass. There might be a tree. There might be a tiny green bit of moss growing in a crack in a wall.

Plants are everywhere on our planet. They grow in hot deserts and on cold mountains, in rivers and rainforests, in city gardens and on farm fields. They even grow on rooftops!

A plant is a living thing, just like you, a cat or a bird. Living things grow. They need water and food. They can make new living things like themselves. Plants do all of these things.

Meet the parts

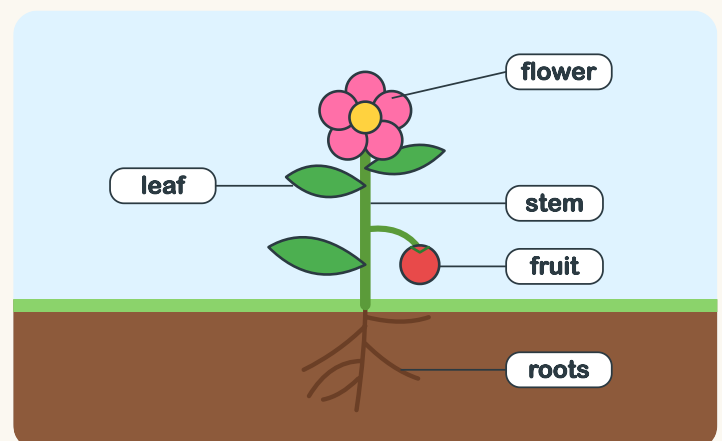
Most plants have the same main parts. Each part has its own job, like the players in a team.

Roots grow down into the soil. They hold the plant tight, and they drink water with tiny bits of goodness called nutrients.

The stem holds the plant up. It is like a drinking straw: water travels up tiny tubes inside it.

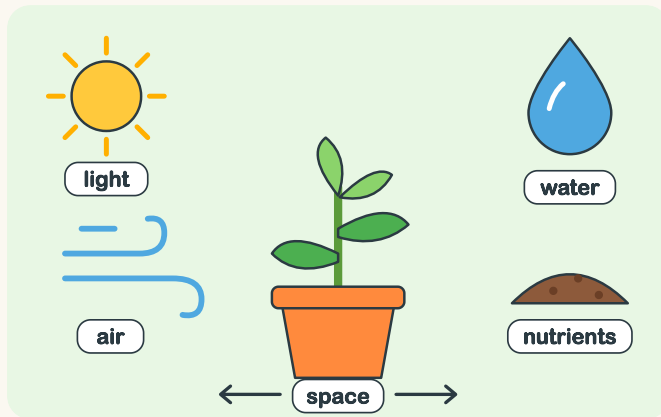
Leaves are the kitchens of the plant, where it makes its food.

Flowers help the plant make seeds. They become **fruits**, and inside the fruits are **seeds**.



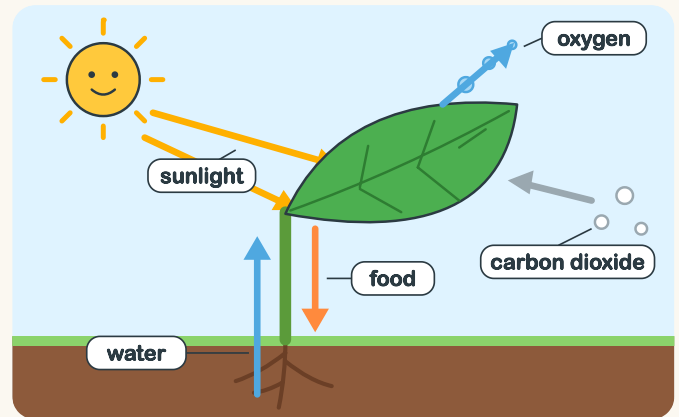
TRY THIS: WATCH A STEM DRINK

With a grown-up, add a few drops of food colouring to half a glass of water. Stand a stick of celery with leaves, or a white flower, in the glass. Wait one day. What colour are the leaves or petals now?



Five things a plant needs

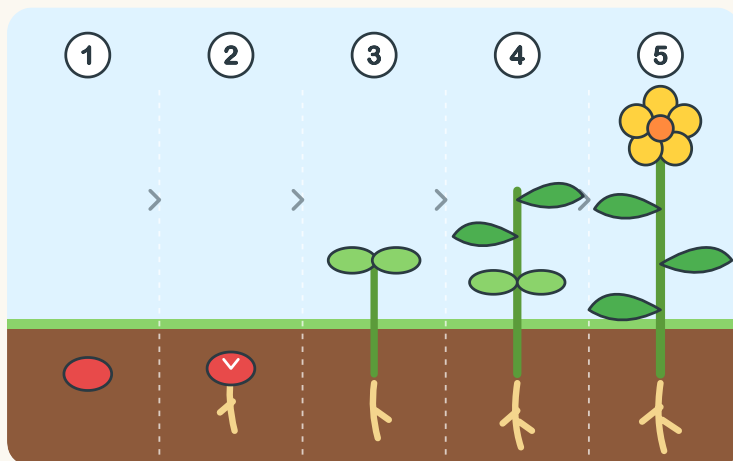
Most plants need **light**, **water**, **air**, **nutrients** from the soil, and **space** to grow. A plant kept in a dark cupboard turns pale and weak. Too little water and it droops; too much can harm the roots.



Food from sunlight

A plant does not eat its dinner from a plate. The leaves catch sunlight, the roots take in water, and tiny holes in the leaves take in a gas called carbon dioxide. With the sun's energy, the leaf turns them into a kind of sugar: the plant's food. This is called **photosynthesis** (foto-SIN-the-sis). As it works, the leaf gives out **oxygen**, which we breathe.

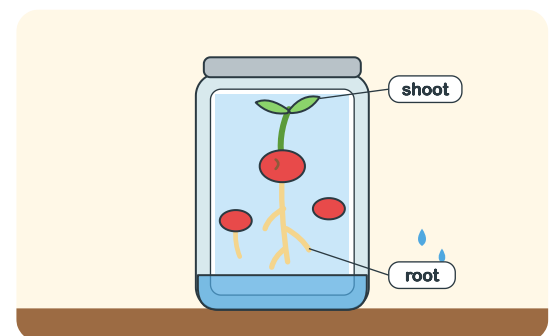
“A plant makes its own food, inside its leaves!”



From seed to plant

A seed is like a tiny packed lunch box with a baby plant inside. With water, air and the right warmth, it wakes up. A root grows down, a shoot pushes up, and the first leaves open. The seedling grows, flowers, and makes new seeds. Round and round, like a wheel: that is a **life cycle**.

TRY THIS: GROW A BEAN IN A JAR



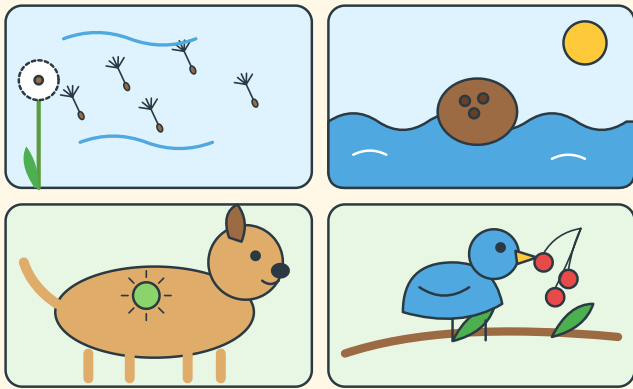
Put a folded paper towel inside a clear jar, against the sides. Push two or three dried beans between the paper and the glass. Keep a little water in the bottom so the paper stays wet, and put the jar somewhere warm. Check every day. Which way does the root grow? Which way does the shoot grow? *Do not eat the beans: raw dried beans can make you ill.*

WORDS TO KNOW

nutrients: Tiny bits of goodness in the soil that help plants grow strong.

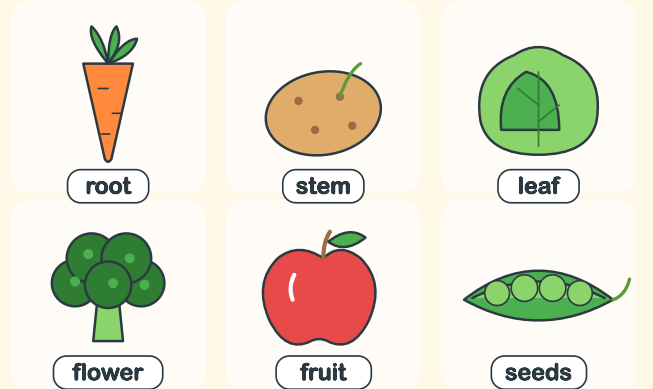
chlorophyll: The green colour in leaves that catches sunlight.

germination: When a seed wakes up and starts to grow.



Seeds go travelling

If all the seeds dropped under their parent plant, they would be squashed together, with no space and not enough light. So seeds go travelling! Dandelion seeds have fluffy parachutes that ride the wind. A coconut can float on the sea for weeks and grow on a new beach. Burrs have tiny hooks that stick to animal fur, or to your socks. And birds eat tasty fruits and drop the seeds far away.



Which part are you eating?

A carrot is a **root**. A potato is a special **stem** that grows under the ground. Lettuce, spinach and cabbage are **leaves**. Broccoli is lots of tiny **flower** buds packed together. Apples, mangoes and tomatoes are **fruits**. Peas, beans, rice and maize are **seeds**.

TRY THIS: THE PLANT PART GAME

At mealtime, look at your plate. For each plant food, ask: is it a root, a stem, a leaf, a flower, a fruit or a seed? Some are tricky! Ask a grown-up to play too.



Plants look after us, and our planet

Plants give us wood for houses, chairs and pencils, cotton for T-shirts, and many medicines. Their roots hold the soil so rain and wind cannot carry it away. Trees give shade, and plants take in carbon dioxide and give out oxygen. That is why people all over the world plant trees and look after forests. You can help too!

QUICK QUIZ

1. Which part of a plant drinks water from the soil?
2. What do plants give out that we need to breathe?
3. A carrot is which part of a plant?

Answers: 1 the roots · 2 oxygen · 3 a root

FOR GROWN-UPS

The full book has ten short chapters, 17 “words to know”, a ten-question quiz and many “Try this” activities. Please supervise every activity, never let children eat seeds, beans or wild berries, and wash hands after handling soil and plants. Adapt the examples to what grows where you live.



READ THE WHOLE BOOK

laisha.ai/kids/class-1/what-is-a-plant

What Is a Plant? Laisha Kids, Class 1. Ten chapters, read aloud together.

Reading the *animal*

A sow chewing an empty mouth for hours, a cat that has stopped grooming, a heifer that will not walk into the crush: each is telling us something. A chapter-by-chapter tour of Laisha's manual on Animal Behaviour, Ethology & Welfare Science.

Ethology is the scientific study of animal behaviour: what animals do, how the behaviour is produced, how it develops, what it is for and how it evolved. Welfare science asks a related question: how is this animal faring, in its body and in its experience, in the conditions in which it lives and dies? The two belong together, because behaviour is the most direct window a veterinarian has into how an animal feels. The World Organisation for Animal Health lists animal welfare among the Day 1 competencies of every graduating veterinarian.

1 FOUNDATIONS OF ETHOLOGY AND LEARNING THEORY

Ethology asks four classic questions about any behaviour: what causes it, how it develops, what it is for and how it evolved. Young animals pass through sensitive periods; puppies are most open to socialisation from about 3 to 12–14 weeks of age, kittens from about 2 to 7 weeks. Learning runs from habituation, getting used to a harmless repeated stimulus, to associative learning, in which reinforcement makes a behaviour more likely and punishment less likely. Behaviour rewarded unpredictably is the hardest to extinguish.

2 NORMAL BEHAVIOUR OF FARM SPECIES

Knowing normal is how you notice abnormal. Calves and goat kids are “hidiers” that lie still while the mother grazes; lambs and foals are “followers”. Dairy cows lie down for roughly 10 to 14 hours a day and will give up eating time to rest, and a fall in rumination time is an early sign of disease. Sheep have the strongest flocking instinct, so a sheep should never be isolated without need. Pigs cool themselves by wallowing, and sows build nests about a day before farrowing.

3 NORMAL BEHAVIOUR OF COMPANION ANIMALS

Dogs show fear early through small signals: lip licking, yawning, turning the head away, lifting a paw, or “whale eye”, showing the whites of the eyes. Punishing a growl can remove the warning and leave a dog that bites without one. Cats naturally live in colonies of related females,

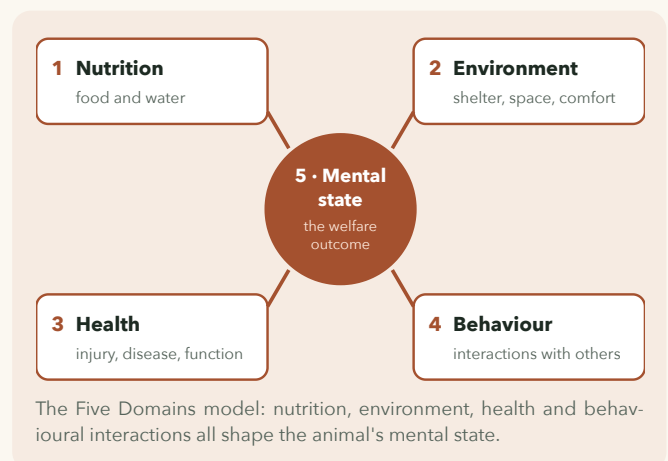
so unrelated cats sharing a home may stay in conflict. Urine spraying is marking, not toileting; scratching is normal; and a place to hide is a key resource for a cat at home, in a shelter or in a clinic.

4 BEHAVIOURAL SIGNS OF PAIN

Prey species and cats hide pain, so the manual teaches you to watch the undisturbed animal first, then interact and examine. Grinding the teeth signals pain in cattle, sheep, goats and horses, and a horse with laminitis rocks its weight back onto its heels. Heart rate and breathing rate are not specific for pain. Validated tools help: grimace scales score changes in the face, and composite pain scales for dogs and cats set scores at which pain relief should be considered.

5 BEHAVIOURAL SIGNS OF STRESS AND ABNORMAL BEHAVIOUR

The stress response has a fast arm, adrenaline acting within seconds, and a slower hormonal arm acting within minutes through cortisol. Cortisol is not a pure distress marker: it also rises with handling for sampling, with the time of day and even with positive excitement. Faecal samples reflect the hours to a day before; hair reflects weeks to months. Stereotypies, repetitive and unvarying behaviours with no obvious function such as bar-biting in sows or crib-biting in horses, point to frustration or an animal trying to cope.

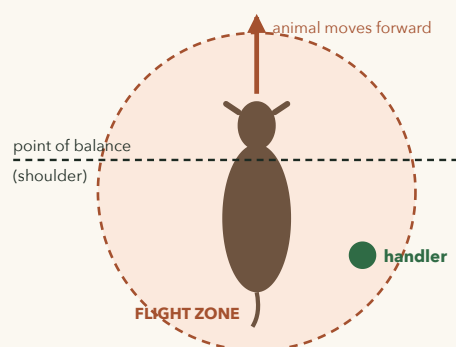


6 WELFARE CONCEPTS: FIVE FREEDOMS, FIVE DOMAINS AND BEYOND

The Five Freedoms are freedom from hunger and thirst; from discomfort; from pain, injury and disease; to express normal behaviour; and from fear and distress. They grew from a 1965 report asking that animals at least be able to stand up, lie down, turn around, groom themselves and stretch their limbs. The newer Five Domains model (diagram) makes mental state the welfare outcome. Recent thinking adds positive welfare, a good life and One Welfare, which links animal welfare, human well-being and the environment.

7 WELFARE ASSESSMENT

Resource-based measures record what an animal is given; animal-based measures record how the animal actually is, and the World Organisation for Animal Health (WOAH) favours these outcomes. Protocols such as Welfare Quality use four principles (good feeding, housing, health and behaviour) and 12 criteria. Observers can rate demeanour, from relaxed to fearful, or measure how close a person can approach. Every measure must be valid, reliable and feasible.



Low-stress handling: work from behind the point of balance at the shoulder, at the edge of the flight zone. Step in front of the shoulder and the animal tends to stop or turn back.

8 HANDLING AND RESTRAINT

Low-stress handling works with the way animals see and move (diagram); the flight zone is smaller in tame, well-handled animals. Animals balk at shadows, reflections, dangling chains, air in their faces and people visible

ahead, and curved races with solid sides use their tendency to return the way they came. Poultry should be carried upright and supported, never by one leg.

9 WELFARE IN TRANSPORT

WOAH's standards cover transport by land, sea and air. An animal that cannot stand or bear weight, is blind in both eyes, has an unhealed navel, is in the final 10% of pregnancy, or is severely sick or injured is unfit to travel; it should be treated or humanely killed on the farm, not loaded. Heat stress is worst when a vehicle stands still, and chronic stress can show up later as dark, firm, dry meat.

10 WELFARE AT SLAUGHTER

Calm movement through the lairage, correct placement of the stunning device and constant checking decide whether slaughter is humane. An effective stun shows immediate collapse, no rhythmic breathing, no corneal reflex, a fixed stare and a relaxed jaw. Some methods are reversible, so bleeding must follow quickly. Regular audits keep standards from slipping.

11 HOUSING AND ENVIRONMENTAL ENRICHMENT

Enrichment can be social, occupational, physical, sensory or nutritional, but it only counts if welfare measures actually improve; adding objects is not enough. Pigs need material they can root, chew and manipulate, and a hanging chain alone does not meet that need. Legal minimums for space and housing vary between countries.

12 BEHAVIOURAL PROBLEMS IN COMPANION ANIMALS

First rule out medical causes, then diagnose the motivation, not just the behaviour. Most aggression in dogs is fear-related, and confrontational “dominance” methods increase the risk of bites. Separation-related problems happen only when a dog is alone or apart from the person it is attached to. For cats, a simple rule prevents much house soiling: one litter tray per cat plus one, in separate places, cleaned daily.

“Behaviour is the most direct window a veterinarian has into how an animal feels.”



READ THE FULL MANUAL

laisha.ai/degrees/veterinary/animal-behaviour-welfare

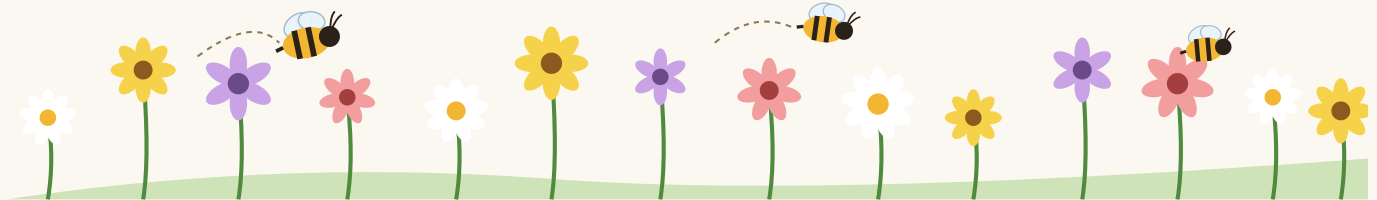
Twelve chapters with key points, practice questions and sources.

To read the entire manual, scan or visit laisha.ai/degrees/veterinary/animal-behaviour-welfare

SUSTAINABILITY · DEGREE MANUAL

The quiet work of *pollinators*

Every farm is an ecosystem. It borrows pollination, pest control, fertile soil and clean water from nature, and pays them back, or runs them down, with every season's decisions.



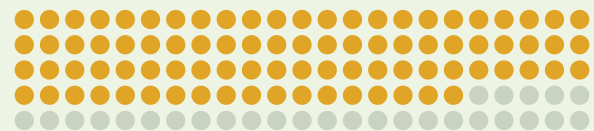
Stand at the edge of a flowering orchard on a warm morning and listen. The hum is the sound of a service that no farmer invoices and no market prices. Laisha's manual on ecosystem services and pollinators starts from a simple idea: farms are ecosystems. They depend on services that nature provides, from the bees that carry pollen to the soil organisms that build fertility, and they in turn produce food while changing the services that neighbours downstream, and people in the future, will receive.

Ecosystem services, the benefits people obtain from ecosystems, have been gathered into frameworks over the past three decades. The Millennium Ecosystem Assessment of 2005 sorted them into four families: provisioning services such as food, fibre, fuel and fresh water; regulating services such as climate regulation, flood control, pollination and pest control; cultural services such as recreation, heritage and a sense of place; and supporting services such as soil formation and nutrient cycling, which make the others possible. It found that about 60 per cent of the services it examined, 15 of 24, were being degraded or used unsustainably. Today the intergovernmental science-policy platform on biodiversity, IPBES, speaks of "nature's contributions to people".

Regulating services are the ones most easily forgotten, because they are often invisible until they are lost. When wetlands are drained, floods do more damage. When hedgerows are removed, wind erosion and pest outbreaks rise. When pollinators decline, fruit set falls. Many of these services work at the scale of the landscape rather than the field, so one farmer's hedgerow helps the neighbours' pollination and pest control as well as their own.

The numbers behind pollination are striking. A widely cited global study from 2007 found that 87 of the 115 leading food crops, about three-quarters, benefit to some

degree from animal pollination. Yet those crops make up only about a third of global food production by volume, because the great staple cereals do not need animals to carry their pollen. The IPBES pollination assessment of 2016 estimated that 5 to 8 per cent of global crop production is directly attributable to animal pollinators, and that pollinator-dependent crops supply much of the vitamin A, vitamin C and folate in human diets. Fruits, vegetables, nuts, oilseeds such as mustard and sunflower, coffee and cocoa all depend on pollinators, some a little and some completely.



87 of 115 leading food crops benefit from animal pollination...

...but only about a third of food production.

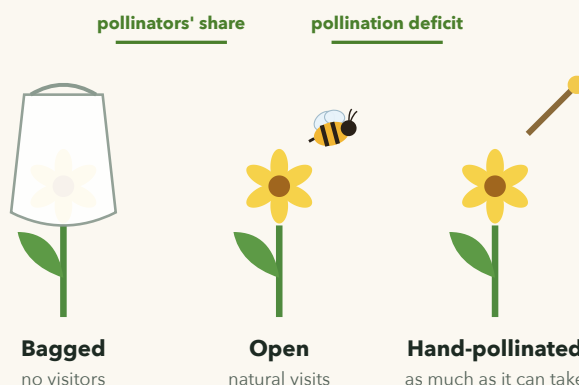
Source: a 2007 global study cited in the manual. Wheat, rice and maize need no animal pollinators.

There are more than 20,000 species of bee, and the managed honey bee is only one of them. Wild bees and other insects often pollinate more effectively, and a diverse community of pollinators raises fruit set even where honey bees are plentiful. The same assessment found that wild pollinators have declined in occurrence and diversity in many regions: 16.5 per cent of vertebrate pollinators, such as some birds and bats, are threatened with global extinction, and where regional assessments exist, often more than 40 per cent of invertebrate pollinator species, particularly bees and butterflies, are threatened. The drivers include lost habitat, monocultures and pesticides, parasites such as the Varroa mite, invasive species and a changing climate.

The good news is that pollinator-friendly farming is practical. Wildflower strips, flowering hedgerows, field margins and cover crops such as clover and mustard provide food through the season. Bare ground for ground-nesting bees, and dead wood and hollow stems for cavity nesters, provide homes. Integrated pest management, no spraying during flowering or while bees forage, less toxic products and margins protected from drift all reduce the risk from pesticides. Where pollinators have collapsed, the cost becomes visible: apple growers in parts of the Himalaya and south-west China have had to rent honey bee colonies or pollinate flowers by hand. In Luxembourg, this issue's country, old meadow orchards of tall fruit trees are treasured for their wildlife.

“One farmer's hedgerow helps the neighbours' pollination and pest control as well as their own.”

How does a farmer know whether pollination is limiting the harvest? The manual describes a simple, powerful experiment (below). Bag some flowers so no visitor can reach them, leave others open, and pollinate a third group by hand as fully as possible. The gap between open and hand-pollinated flowers is the pollination deficit; the gap between open and bagged flowers is what pollinators already contribute. Studies across Asia, Africa and Latin America, on crops from mustard and sunflower to pigeonpea, coffee and apple, have found that wild bees add substantially to yield and quality.



The exclusion experiment: compare fruit or seed set on bagged, open and hand-pollinated flowers of the same crop.

Pollinators share the field with another unpaid workforce: ladybirds, lacewings, ground beetles, spiders, birds and bats that eat pests, and tiny wasps and flies that lay their eggs in them. Flower strips, beetle banks, hedgerows, intercropping and fewer broad-spectrum insecticides all help these allies. In East Africa, the push-pull system plants maize with a legume, *Desmodium*, that repels stemborer moths, and borders it with a trap grass that draws them away; *Desmodium* also suppresses the parasitic *Striga* weed and fixes nitrogen. Results vary from place to place, the manual warns, so design for the system, then measure.

Beneath the crop, soil forms slowly, commonly well under a millimetre a year, while erosion on bare, sloping land can remove several millimetres a year; where erosion is high, soil is effectively non-renewable on a human time scale. Cover crops, reduced tillage, agroforestry and buffer strips keep soil in place and water clean.

The world is also learning to count these services. Since 2021 an international statistical standard, SEEA Ecosystem Accounting, has recorded the extent and condition of ecosystems and the services they supply, which GDP alone ignores, and food companies are beginning to assess how much they depend on pollination, water and healthy soil.

Global figures should never be applied to a single farm without local data, the manual cautions. But the direction is clear: every flower strip, every hedgerow and every season without an unnecessary spray pays back into the account that farming draws on.



READ THE FULL MANUAL

laisha.ai/degrees/sustainability/ecosystem-services-pollinators

Ecosystem Services & Pollinators: ten chapters, from frameworks to natural capital accounting.

CROP · GROW GUIDE

Grapes: a vine *for a lifetime*

On the steep slopes above Luxembourg's Moselle, Riesling, Auxerrois and Pinot Gris ripen in the autumn sun. The same plant grows on every inhabited continent. Here is how it is really grown, from Laisha's grow guide.

The grapevine, *Vitis vinifera*, carries a name given by Linnaeus himself: *Vitis* is Latin for “vine”, and *vinifera* means “wine-bearing”. Angur, üzüm, inab, Traube, uva, vinograd and stafyli are all names for this same plant. Its partnership with people is among the oldest in farming. Residues in pottery jars about 8,000 years old, found at two sites in Georgia, are currently the earliest confirmed evidence of winemaking, and a complete Copper Age winery, with a press, fermentation jars and grape pips, was found in the Areni-1 cave in Armenia, dated to around 4100 BC.

Today the vine grows around the Mediterranean, in the Caucasus and Central Asia, in southern Africa and the Middle East, and on the temperate coasts of the Americas and Oceania. In Luxembourg, this issue's country, the vineyards line the Moselle on the eastern border, giving white wines and the sparkling Crémant de Luxembourg. The little wine village of Schengen, which gave its name to Europe's border-free travel agreement, sits among them.

A CLIMBER, NOT A TREE

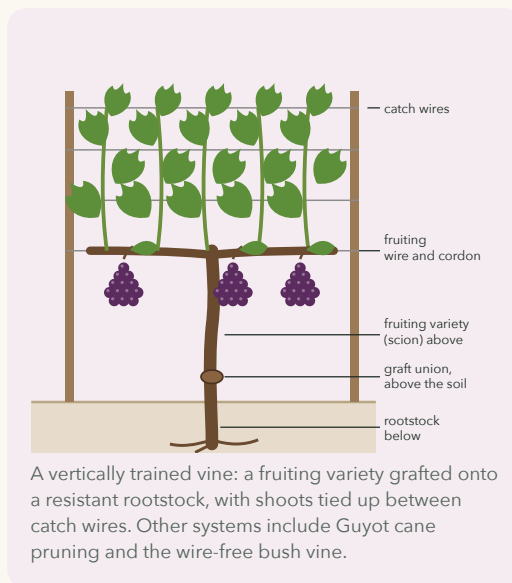
A grapevine is a liana, a woody vine that climbs with coiling tendrils. It cannot hold its own weight like a tree trunk. Left alone, it sprawls, pours its energy into leaves and leaves its fruit lying in the dirt. On a farm, a trellis of posts and wires lifts the fruit into sun and moving air, which improves quality and lowers disease. The guide's first rule is to build the trellis before planting, because adding one to established vines is a much harder correction.

TWO PLANTS IN ONE

Almost every commercial grapevine alive today is two plants grafted together: a fruiting variety on top, and the root of a different, American grape species below. The reason is a tiny root-feeding insect, phylloxera, native to eastern North America. Carried to Europe on American vines in the mid-1800s, it found the roots of *Vitis vinifera* undefended and devastated vineyards across France and beyond. Growers learned through painstaking trials that

American rootstocks seal off phylloxera wounds. Grafting saved Europe's vineyards and remains the standard today. There is still no chemical cure once phylloxera is established in an ungrafted vine.

So the guide asks you to choose two things together: a fruiting variety for your market, and a rootstock for your soil and pests. Both should come from a certified nursery that tests its mother plants for grapevine viruses, because a virus carried in at planting cannot be cured later.

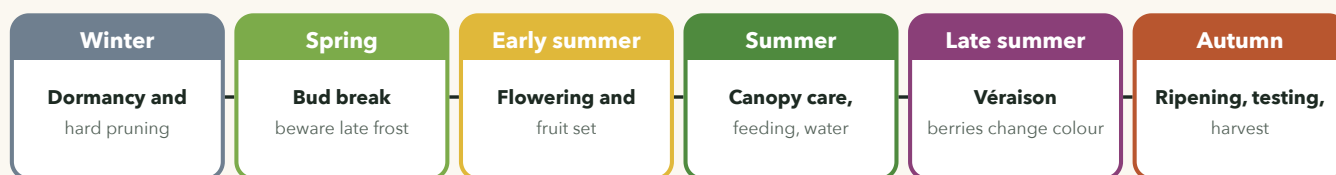


REMEMBER IT THIS WAY

- It climbs: build its trellis before it ever needs one.
- Two plants in one: a fruiting variety on a tough American root.
- Decide what the vine is for: fresh eating, wine or raisins.
- Prune it back hard every single winter, on purpose.
- Watch for véraison, when berries change colour.
- Some threats ask for prevention, not a cure.

A YEAR ON THE VINE

Seasons as in temperate regions; timing follows warmth, not the calendar



DECIDE YOUR MARKET FIRST

Few crops split as sharply as grapes. **Table grapes** are judged on looks above almost everything: large, uniform, often seedless berries with flawless skin. **Wine grapes** are judged on what is inside the berry, above all sugar and acid; most table wines are picked at about 19 to 25 degrees Brix, a measure of sugar read with a handheld refractometer. **Raisin grapes** need high sugar and thin skins that dry evenly without splitting. The three markets disagree about what a good grape is, so the decision comes before the variety, the pruning, the watering and the harvest method.

PATIENCE, THEN PRUNING

A new vineyard gives no real harvest for about two years, a first small crop around year three and full yield in year four or five. After that, a well-run vineyard commonly stays productive for 25 to 30 years, and a vine kept longer can bear for a century or more. The Great Vine at Hampton Court Palace in England, planted in 1768, still crops more than 250 years later.

The vine also needs a real winter cold period to go dormant and break bud properly, which makes a frost-free tropical site the wrong place for it. Every winter, during dormancy, it is pruned back hard. An unpruned vine sets far more buds than it can ripen: more fruit, and worse fruit. Spur pruning cuts short stubs on a permanent arm back to two or three buds; cane pruning replaces the fruiting canes each year.

“Build the trellis, choose the graft and the market together, and fight the season-long fungal war every single year.”

FROST, FLOWERS AND VÉRAISON

Young shoots have almost no frost tolerance, so one cold night after bud break can destroy a year's crop. Grape flowers are mostly self-pollinated, but cool, wet or windy weather at flowering can still cost yield through poor fruit set. In late summer comes *véraison*, when berries change colour and soften: red varieties turn red or purple, white ones a translucent gold. From that moment sugar rises sharply, acid falls, and birds take notice. Wine growers then sample berries from across the block and follow the trend in Brix and acidity, not a single reading.

THE FIGHT THAT NEVER STOPS

Powdery mildew and downy mildew do not wait for one weak stage; they threaten the vine from bud break to harvest every year. Open canopies, clean pruning and a spray programme rotated by mode-of-action group are part of growing grapes well. Laisha never names a pesticide brand or compound: the guide names the group and sends you to a licensed dealer and to the label. Newer fungus-resistant varieties are being bred to cut fungicide use. Some threats cannot be sprayed away at all: Pierce's disease, a bacterial disease spread by insects, can kill a vine within three to five years and has no cure, so prevention is everything.



READ THE FULL GROW GUIDE

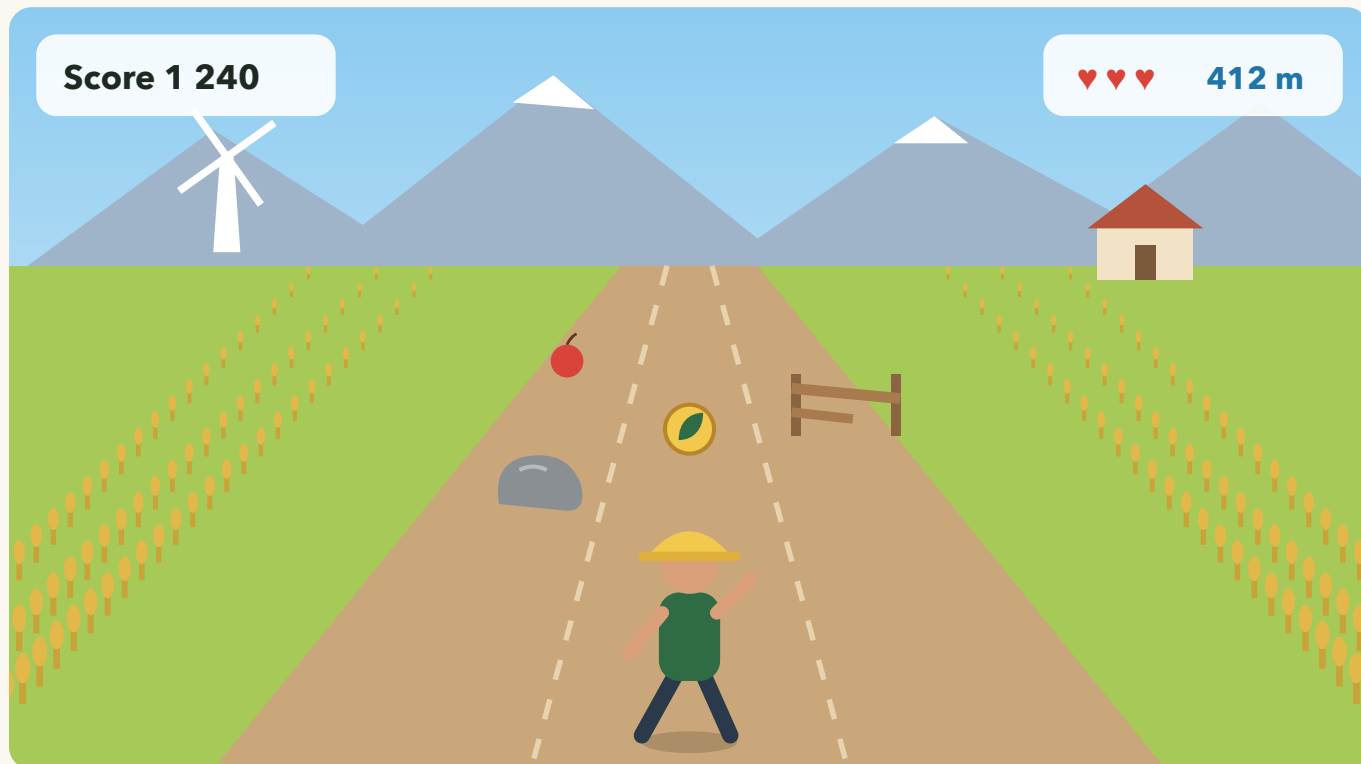
laisha.ai/guides/grape

Sixteen stages from choosing land to replanting, with troubleshooting, harvest and processing.

GAME • FREE TO PLAY

Laisha Run: *harvest at full speed*

A free farm runner that opens in the browser you already have. No download, no app store, no account and no sign-in. Just a field trail, a full harvest and a lot of things in the way.



Most of Laisha is about work: manuals, grow guides, diagnosis, planning. Laisha Run is the one thing in Laisha that is not trying to help anybody grow anything. People who spend their days on real fields deserve a few minutes of play, and a tool that is only ever work is a tool people put down.

The idea is simple. You sprint down a farm trail that never ends, with mountains on the horizon, a windmill and a farmhouse along the way. Produce appears in your path to grab. The hazards of a working farm appear to dodge. The longer you last, the faster and busier the farm becomes.

HOW TO PLAY

The trail has three lanes. Move left and right between them, jump over things on the ground and slide under things at head height. On a laptop, use the arrow keys; on a phone, swipe, or tilt the phone itself to steer. You have three lives. Each obstacle you hit costs a life, and when the last one is gone the run ends and the game shows how far you got, in metres, and whether you beat your own best.

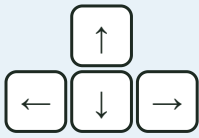
THE HARVEST

Every crop you collect adds to your score. Collect without a break and your combo grows, and with it a score multiplier; hit an obstacle and the combo resets to zero. The rare golden harvest token is the big prize, worth far more than any single crop, and it is counted separately on screen.

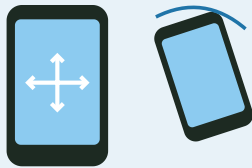
THE HAZARDS OF A WORKING FARM



CONTROLS



Laptop: arrow keys



Phone: swipe or tilt to steer

POINTS PER PICKUP

Wheat	5
Seeds	6
Water	7
Corn	8
Tomato	10
Apple	10
Mango	12
Harvest token (rare)	50

Base points, before your combo multiplier.

START IN THREE STEPS

1. Scan the code below or open laisha.ai/tools/laisha_run on a phone, tablet or laptop.
2. Press start. There is nothing to install and no account to make.
3. Run, harvest, and try to beat your own best.

TIPS FROM THE TRAIL

Read the height, not the shape. Anything sitting on the ground is jumped; only the broken fence and the pest swarm are slid under. Learn that one rule and most early lives are saved.

Protect the combo. Because the multiplier builds with every pickup in a row and vanishes when you hit something, a long clean streak is worth more than a risky lane change for one tomato.

Go for the gold. One harvest token is worth fifty points before the multiplier, ten times a sheaf of wheat.

Settle in early. The first seconds are gentle, so use them to find your rhythm. Speed and the number of obstacles rise with distance, and they do not let up.

Pause when life calls. Press Esc or P on a keyboard, or the pause button on a phone. Cows wait for no one.

“The one thing in Laisha that is not trying to help anybody grow anything.”

READER CHALLENGE

Play three runs this week and write down your best. Then try the extra challenges. Share your scores with friends and see who leads the field.

My best score	_____
My longest run (metres)	_____
Harvest tokens in one run	_____
A full run without losing a life to the pest swarm?	Yes / Not yet



PLAY FREE IN YOUR BROWSER

laisha.ai/tools/laisha_run

Free to play, and it stays free. Nothing to install.

AN APP IN LAISHA

Crop Health: *an honest second opinion*

Photograph what is wrong, say what you have noticed, and get back an organised reading of what is visible, what it could be and how sure anyone can be. What it will not do matters just as much.

Every grower knows the feeling: a patch of yellow leaves, a spot that was not there last week, a crop that suddenly looks wrong. Crop Health is Laisha's photo-based crop diagnosis, built for that moment. You send one photo of the whole plant and one close-up of the affected leaf, stem or fruit, add the crop name and whatever you know, and it returns a structured report: what the evidence shows, the possible cause groups, what to do in the next 24 hours, a seven-day watch plan, and a short brief you can forward to an agronomist.

It accepts several photographs of the same problem and reads each in turn, because one leaf rarely tells the whole story. A pattern that looks like disease on a single leaf often turns out to be the shape of the problem in the field: worse at the edges, worse in the low corner, worse on one variety.

THE QUESTIONS A GOOD AGRONOMIST ASKS

Before it looks, Crop Health asks what a good agronomist would ask: the crop, its stage, how widespread the problem is, how worried you are, and the recent weather, irrigation, fertiliser and sprays. These answers change the diagnosis. The same yellowing means different things at tillering and at grain fill, and after a spray rather than after a flood. Scattered single plants point to different causes than sharp patches, and a uniform symptom across a whole field is very often not a disease at all, but nutrition, water or a spray.

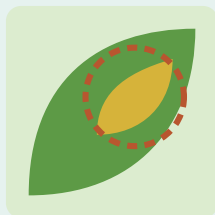
The single field that changes more answers than any other is recent conditions, especially any herbicide on your field or the one next door. Drift damage is common and looks like disease to anyone who does not know the spray went on.



The report: observation first, then cause groups, safe steps and when to call an expert.



1 • Whole plant



2 • Close-up

include the edge



3 • Context

stage, spread, sprays

How to photograph a crop problem. Daylight, in focus, the affected part filling the frame, plus a wider photo of the whole plant. Include the boundary between healthy and affected tissue: most of the diagnostic information is in that edge.

WHAT IT CAN DO

- Read several photographs and your description together.
- Separate what it observed from what it inferred, and say which is which.
- List possible cause groups in order, with the evidence that would separate them.
- Suggest first steps for the next 24 hours that are safe whichever cause turns out to be right.
- Give a seven-day watch plan: whether patches spread, whether new leaves are affected, whether it stops at a field boundary.
- Work from a written description if you have no photo, and say plainly that the answer is broader.

WHAT IT CANNOT DO

- Test tissue, see roots or culture a pathogen.
- Confirm a disease from a photograph alone.
- Prescribe a chemical or a dose. That needs a confirmed diagnosis, your local registrations, the crop's stage and a pre-harvest interval, and a photo supplies none of them.
- Rescue a blurred, dark photo with no context: it will say the evidence was weak rather than guess.
- Replace a person who can stand in your field. Anything costly to act on is flagged for one.

WHY CAUSE GROUPS, NOT ONE NAME?

Several real causes look alike in a photograph. Narrowing them to one would mean choosing arbitrarily and sounding certain about it. A list of cause groups, with the evidence that would tell them apart, is more useful to act on, and it is what an agronomist standing in the same field would say. A diagnosis nobody can act on is a word, not help.

A WORKED EXAMPLE

A tomato crop, 45 days old and flowering, shows yellowing on its lower leaves in sharp patches across part of the field, a week after heavy rain, with no recent spray. Crop Health describes what the photographs show as observation, not conclusion. Because the problem is patchy and followed heavy rain, it puts waterlogging and root-zone problems alongside leaf disease rather than behind it. It suggests safe steps for the next day, sets out what to watch over the coming week, and lists the signs that mean you should stop waiting and get expert help. It does not name one disease and send you to buy a chemical.

“A photograph alone is never treated as confirming a disease or prescribing a treatment.”

WHAT USUALLY GOES WRONG

One blurred photo and no context. Photographing only the worst plant, when the spread across the field is itself evidence. Leaving out a recent spray. Treating a cause group as a diagnosis and buying a chemical for it. And waiting a week to check, by which time the early, cheap, treatable stage has passed. Open Crop Health the day you first notice something.

READ THE REPORT THE RIGHT WAY

Start with “Get expert help if”: it is the most important section when the crop matters. Then use the “Message for your agronomist” section, which is written to be forwarded, or download the report as a PDF to take to someone. Crop Health is one of Laisha's paid tools, because reading photographs costs real money per use. A good way to decide whether to trust it is to test it first on a problem you already know the answer to.

**TRY CROP HEALTH**

laisha.ai/tools/crop_doctor

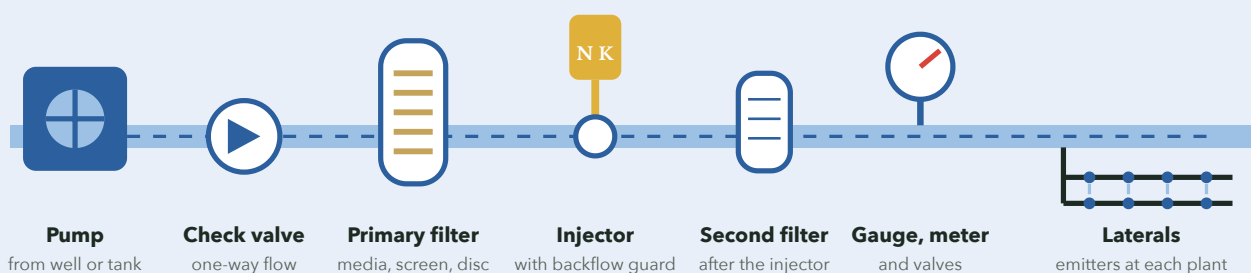
Open it on laisha.ai or in the Laisha app.

FROM THE LAISHA LIBRARY · AGRICULTURAL ENGINEERING

Sprinkler and drip, *explained*

Pressurised irrigation can water a field more evenly than any surface method and feed the crop through the same pipes. Done badly, it clogs, floods and never repays its cost. A tour of Laisha's degree manual on Sprinkler & Micro-Irrigation Systems.

THE DRIP HEAD UNIT, IN ORDER



Sprinkler and micro-irrigation are the two families of pressurised irrigation. In both, a pump or a raised tank pushes water through closed pipes, and the water leaves through a device, a sprinkler nozzle, a dripper or a micro-sprinkler, whose flow depends on the pressure at that device. That single fact explains almost every design rule in the subject. If pressure varies too much along the pipes, flow varies, the crop is watered unevenly, and the farmer must either over-irrigate to satisfy the driest spot or accept lost yield where water falls short.

The subject sits between fluid mechanics and agronomy. The engineer starts from the crop's water need and the soil's intake rate, adds pipe friction and pump curves, and turns them into spacings, pipe sizes, zones, filters, fertiliser injection and a pump that runs efficiently.

SPRINKLERS: TYPES AND SPACING

A sprinkler system has a pump, a mainline, sub-mains, laterals, risers and sprinklers, with valves and regulators between. Permanent and solid-set systems cost more in pipe but little in labour; hand-move systems are the reverse. A centre pivot waters a circle covering about 78.5 per cent of the square around it, and because the outer spans travel furthest, discharge and application rate rise towards the end. Pressure matters at the nozzle: too low gives big drops and a doughnut-shaped pattern, too high

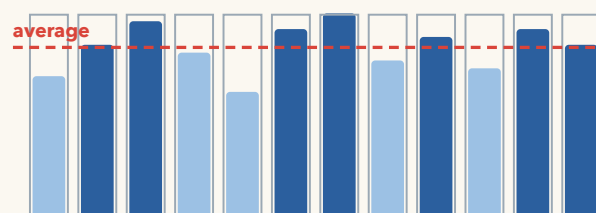
gives mist, drift and evaporation. Sprinklers are usually spaced at about one-half to two-thirds of their wetted diameter, closer in wind.

$$\text{Application rate (mm/h)} = 3600 \times q \text{ (L/s)} \div (S_l \times S_m)$$

The golden rule: the application rate must never exceed the soil's basic infiltration rate, and should be lower still on slopes and crusting soils, or water runs off instead of soaking in.

HOW EVEN IS EVEN?

Uniformity is measured by setting out a grid of catch cans and comparing what each collects. Christiansen's uniformity coefficient, from 1942, compares each catch with the average; the newer distribution uniformity compares the driest quarter with the average. Wind, wrong pressure, worn nozzles and bent risers are the common culprits when uniformity is poor.



A catch-can test (illustrative values): pale bars are cans below the average. The closer the bars, the higher the uniformity.

DESIGNING THE PIPES

Christiansen's classic rule keeps pressure variation along a sprinkler lateral within 20 per cent of operating pressure, which holds discharge variation to about 10 per cent. Friction in a pipe with many outlets is less than in a plain pipe, and the manual shows how the Christiansen F factor accounts for that, and how slope adds to or subtracts from the pressure needed at the inlet.

DRIP: WATER NEAR EACH PLANT

Micro-irrigation applies water slowly to part of the soil near each plant: drippers, micro-sprinklers, bubblers and subsurface drip. The head unit runs in a set order (previous page), and a screen or disc filter always sits downstream of the fertiliser injector. Laterals are polyethylene, with flush valves at the ends. Emitters range from long-path and labyrinth types to pressure-compensating ones, which hold their flow nearly constant as pressure changes.

Emitter law: $q = k h^x$

The exponent x tells you how sensitive an emitter is to pressure: about 0.5 for a simple orifice, near zero for a pressure-compensating emitter. Every emitter also has a small manufacturing variation, so designers combine that variation with pressure differences to set a target emission uniformity for each block. Run time then follows simply: the daily water each plant needs, divided by the number of emitters per plant and their discharge.

“In pressurised irrigation, the filter decides success.”

FILTRATION AND WATER QUALITY

Clogging can be physical, chemical or biological. Filters deal with the physical part; water treatment deals with the rest. Hydrocyclones remove sand, media filters handle algae and organic loads, screens handle light inorganic dirt, and disc filters handle a mix. The filter should be several times finer than the smallest emitter passage, and filters are backflushed when the pressure drop across them reaches a set value. Acid dissolves carbonate scale; chlorine controls slime and algae.

FERTIGATION, SAFELY

Fertigation feeds dissolved nutrients, mainly nitrogen and potassium, through the water in small doses. Injectors range from simple fertiliser tanks to venturis with no moving parts and precise injection pumps. Two safety rules stand out: never mix calcium with sulphates or phosphates in one stock tank (do a jar test), and always fit backflow protection so chemicals can never flow back into the water source.

PUMPS, AUTOMATION AND MONEY

The field is split into shifts of roughly equal flow so the pump runs near its best efficiency. By the affinity laws, flow rises with pump speed, head with its square and power with its cube, so a small change in speed makes a big difference to energy use. Normally closed solenoid valves fail safe. Finally, the economics: each component is annualised over its own life, pipe size is chosen to minimise pipe plus energy cost, and the manual adds an honest warning: water saved in the field is not always water saved in the river basin.

NUMBERS WORTH REMEMBERING

A 20% change in pressure changes nozzle discharge by about 10%.

Fit media filters at least in pairs, so one can backflush the other.

A centre pivot waters about 78.5% ($\pi/4$) of the square around it.

About four tank volumes flush roughly 98% of fertiliser from a tank injector.

120 mesh is about 125 μm ; 200 mesh is about 75 μm .

Flush drip laterals at about 0.3 m/s or more at the end.



READ THE FULL MANUAL

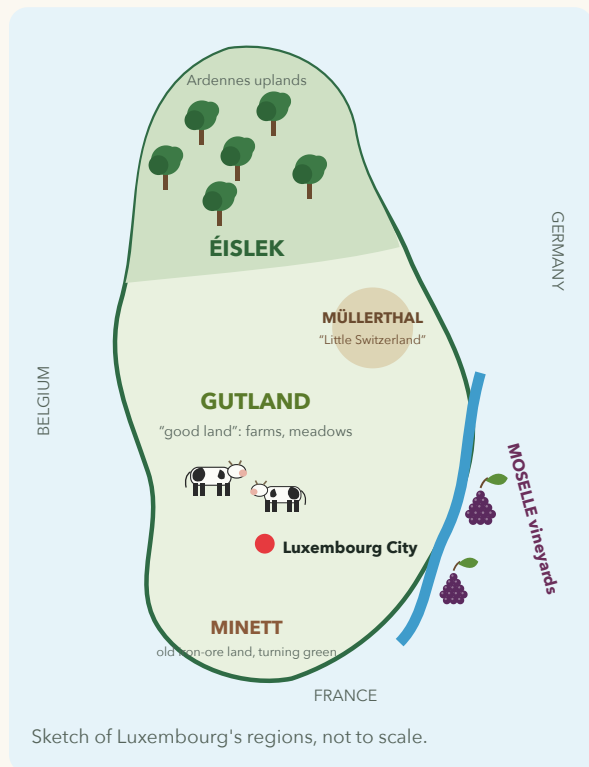
laisha.ai/degrees/agri-engineering/sprinkler-micro-irrigation

Twelve chapters of design, from nozzle hydraulics to economics, with worked examples.

COUNTRY FUN · ISSUE 1

Luxembourg: *forests, vines and cows*

A small green Grand Duchy of forests, vineyards, castles and cows, right in the heart of Western Europe. Say “Moien!” to this issue's happy country.



Luxembourg is one of the smallest countries in Europe; you could drive across it in about an hour. It is landlocked, with no coast, but it has plenty of rivers: the Moselle, the Sauer (Sûre), the Our and the Alzette. Its capital, Luxembourg City, shares the country's name. The old quarters and great stone fortifications stand high above deep green valleys and are a UNESCO World Heritage Site, and the city is one of the official seats of the European Union.

Most children grow up learning several languages. Luxembourgish is the national language, spoken at home and in the street; laws are written in French; many newspapers use German; and lots of people also speak English and Portuguese.

WHY IT MADE OUR HAPPY LIST

Luxembourg regularly ranks among the happiest countries in the world in the World Happiness Report, which asks people in many countries how satisfied they are with their lives. The report links happiness with things like feeling safe, trusting others and having support from friends and family. We like to think that green valleys, forest walks and village orchards help too.

FUN FACTS

- It is the world's only Grand Duchy: its head of state is a Grand Duke.
- Its national motto is “Mir wëlle bleiwe wat mir sinn”: “We want to stay what we are”.
- In 2020 it became the first country in the world to make public transport free nationwide.
- It was one of the six founding members of the European communities that grew into today's European Union.
- The Schengen Agreement, which lets people cross many European borders without checks, is named after Schengen, a wine village on the Moselle where it was signed.
- Luxembourg City is built on cliffs above two rivers, the Alzette and the Pétrusse, with a network of old underground tunnels, the casemates, that visitors can explore.
- National Day is celebrated on 23 June with parades and fireworks.
- The Schueberfouer, a giant funfair held in Luxembourg City every late summer, began centuries ago as a market fair.

QUICK FACTS

Official name	Grand Duchy of Luxembourg
Capital	Luxembourg City
Languages	Luxembourgish, French and German
Size	Roughly 2,600 km²
People	About 700,000, and growing
Neighbours	Belgium, Germany, France
Highest point	The Kneiff, roughly 560 m
Forest	Roughly a third of the land

FARMING: MOSTLY ABOUT GRASS

A large part of Luxembourg's farmland is grassland and meadow, feeding dairy cows and beef cattle, so milk, butter, cheese and beef are important farm products. Farmers also grow wheat and barley, and maize to feed animals, and many farms are family farms. Along the Moselle the big story is grapes: Riesling, Auxerrois, Pinot Gris, Pinot Blanc, Elbling and Rivaner (also called Müller-Thurgau) are well-known varieties, and Crémant de Luxembourg is a sparkling wine made from them. Orchards grow apples, pears and plums, and old meadow orchards of tall fruit trees are treasured for wildlife. Farmers also keep hedges, ponds and flower-rich field edges where bees and birds can live.

“Green valleys, forest walks and village orchards: a happy country always loves plants.”

WORDS TO TRY

Moien	Hello	Luxembourgish
Äddi	Goodbye	Luxembourgish
Merci	Thank you	Luxembourgish
Wéi geet et?	How are you?	Luxembourgish
Bam	Tree	Luxembourgish
Blumm	Flower	Luxembourgish
Gromper	Potato	Luxembourgish
Bonjour	Hello / Good day	French
la forêt	The forest	French
Guten Tag	Good day	German
der Weinberg	The vineyard	German

FORESTS AND WILD PLACES

Forests cover roughly a third of the land. Beech and oak are common in the old woods of the Gutland and the Müllerthal, with conifer plantations too, especially in the north. In spring many forest floors are carpeted with wild garlic, and in the damp gorges of the Müllerthal, mosses and ferns grow thickly over sandstone rocks. The Müllerthal is also a UNESCO Global Geopark. The country has three nature parks, the Upper Sûre, the Our and the Mëllerdall, and the Upper Sûre lake supplies a large part of the country's drinking water. In autumn the beech woods turn gold and copper; in spring the orchards are white and pink with blossom.

ON THE TABLE

Judd mat Gaardebounen, smoked pork collar with broad beans, is often called the national dish. Gromperekichelcher are crispy potato fritters sold at fairs and markets. Bouneschlupp is a green bean soup, Kachkéis a soft cooked cheese spread on bread, and Quetschentaart a plum tart baked in late summer.

MINI-QUIZ

- How do you say “hello” in Luxembourgish?
a) Hola b) Moien c) Ciao
- Which region is nicknamed “Little Switzerland”?
a) The Minett b) The Müllerthal c) The Gutland
- What grows on the steep slopes along the Moselle?
a) Tea bushes b) Rice c) Grapevines
- Roughly how much of Luxembourg is forest?
a) Almost none b) About a third
c) About nine-tenths
- What do most Luxembourg farms mainly grow?
a) Grass for dairy cows and cattle b) Cotton
c) Sugar cane

Answers: 1 b · 2 b · 3 c · 4 b · 5 a



MORE COUNTRY FUN
laisha.ai/countries/luxembourg

Luxembourg on laisha.ai: more facts, words and a longer quiz.

BACK PAGE

The Issue 1 *quiz*

Five questions, one from each corner of this issue. Answers at the foot of the page, no peeking.

1

LAISHA KIDS

Where does a plant make most of its food?

a In its roots **b** In its leaves **c** In its seeds

2

VETERINARY

In the Five Domains model, which domain is the welfare outcome?

a Nutrition **b** Health **c** Mental state

3

SUSTAINABILITY

How many of the 115 leading food crops benefit from animal pollination?

a 12 **b** 87 **c** All 115

4

CROP

What happens to grape berries at véraison?

a They change colour and soften **b** They are pruned **c** They flower

5

LIBRARY

A sprinkler's application rate must not exceed the soil's...

a Colour **b** Infiltration rate **c** Temperature

COMING NEXT ISSUE

Laisha Kids, Class 1: *Seeds and Sprouts*. Seeds of every size, what is inside them, and how to grow beans, peas and cress at home or at school, watching and drawing each day.

A new happy country. Another of the world's happiest countries, and the plants its people love. Can you guess which?

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Agriculture knowledge for everyone, in every country.

Quiz answers: 1 b (In its leaves) · 2 c (Mental state) · 3 b (87) · 4 a (They change colour and soften) · 5 b (Infiltration rate)